Heart failure

1. Mr Wright’s admission states that he has heart failure (congestive cardiac failure). Clearly define heart failure. What organs and which body systems are affected by this disorder?

Heart failure is medical condition where cardiac output of the heart is reduced (Huether, McCance, Brashers & Rote 2012, p. 623), and as a result, insufficient blood, or in other words, oxygen and nutrients can be pumped to meet the body’s needs. This also causes increased diastolic filling pressure of the left ventricle and increased pulmonary capillaries pressures. The cardiac tissues may respond by stretching to hold more blood or by becoming stiff and thickened. This temporarily helps keep the blood moving, but over time, the heart muscle walls eventually weaken and become contract less efficiently (Better Health Channel 2013). Heart failure, when happens to the left side of the heart, is commonly called congestive cardiac failure.

As the heart supplies blood to allow functioning of body tissues, all body systems would be affected by heart failure. In particular, the normal functions of the cardiovascular system, respiratory system and urinary system in the body would be impacted greatly, hence vital body organs such as the heart, lungs and kidneys would not be able to function optimally.

2. Give a brief overview of the normal function of the body systems affected by this disorder.

Cardiovascular system

- Delivers oxygen, nutrients and hormones to body tissues via the blood
- Carries away body waste such as carbon dioxide, urea and bilirubin

- Sustain a reasonably high blood pressure to allow blood perfusion to body tissues in the extremities and to maintain organ function, such as filtration in the glomerulus.

(Marieb 2012, p. 392)

Respiratory system

- Facilitate the movement of air into the lungs while filtering, humidifying and warming it
- Allow oxygen and carbon dioxide exchange in the alveoli

(Marieb 2012, p. 436)

Urinary system

- Kidneys maintain the purity and consistencies of the body internal fluid by filtration of blood
- Regulating the blood’s volume, pressure by secreting enzymes and pH by ensuring acid-base balance
- Allow excretion of wastes and excessive ions while retaining sufficient solutes, nutrients and water.
- Produce erythropoietin to stimulate red blood cell production in the bone marrow
- Kidney cells also convert vitamin D to its active form
- Urinary bladder provide temporary storage reservoirs for urine

(Marieb 2012, p. 534)

Digestive system

- A passageway for food to enter the body from the mouth

- Breaks down ingested food into particles that are small enough to be absorbed into the body to provide nutrients and building blocks for body cells
- Hydrochloric acid (HCl) secreted in the stomach provides nonspecific protection against bacteria
- Control absorption of water to maintain normal blood volume

(Marieb 2012, p. 506)

Lymphatic system

- Returns leaked plasma to the blood vessels
- Immune cells in the lymph ensure cleansing of bacteria and foreign particles

(Marieb 2012, p. 398)

Endocrine system

- Regulate homeostasis by releasing body hormones that are crucial for growth and development, metabolism and reproduction

(Marieb 2012, p. 308)

Nervous system

- Conducts electrical signals to other body parts to maintain body control
- Regulate sensation, coordination, emotional response, mobility and hormones stimulation

(Marieb 2012, p. 226)

3. Define the signs and symptoms of heart failure, and explain why these signs and symptoms occur.

- Swollen ankles or legs (oedema) (American Heart Association 2014)
- As blood flow out of the heart slows, blood returning to the heart accumulates in the veins, causing fluid build-up and increased pressure in the capillaries. This in turn forces fluid to leak out of the vessels and accumulate in the tissues, hence causing oedema. The kidneys are also less able to secrete sodium and water, worsening fluid retention in the tissues.
- Angina
    - As cardiac output decreases, blood perfusion to the tissues supplied by the coronary arteries reduce as well, hence less oxygen is delivered to the cardiac tissues, which causes angina symptoms.
- Weight gain (Healthline 2012)
- Fluid build-up in the body tissues would increase body weight, hence it is important for patients with heart failure to weight themselves often.
- Shortness of breath during rest, exercise, or while lying flat (American Heart Association 2014)
- Blood “ backs up” in the pulmonary vein as blood is not pumped out of the heart efficiently. This increases pressure in the capillaries, causing fluids to leak out into the lungs, resulting in shortness of breath.
- Fatigue/tiredness (American Heart Association 2014)

- Fatigue occurs as body tissues do not receive sufficient oxygen and nutrients, hence energy production is reduced. The body also diverts blood away from less vital organs, for example muscles in the limbs, which causes weakness.
- Loss of appetite/nausea (American Heart Association 2014)
    - Inadequate blood supply to the digestive system, resulting in reduced production of digestive enzymes, reduced absorption and muscle contraction.
- Persistent cough that can cause blood-tinged sputum or wheezing (American Heart Association 2014)
- Fluid builds up in the lungs causing shortness of breath, which causes reflex coughing in the body in attempt to obtain more air.
- Confusion or impaired thinking (American Heart Association 2014)
- Changing levels of electrolytes in the blood such as sodium can cause confusion.
- Rapid or irregular heart rate (American Heart Association 2014)
- The heart beats faster in order to maintain normal cardiac output, in the long term, this would lead to arrhythmia.
- Rapid breathing (Healthline 2012)
    - The body compensates for shortness of breath by increasing respiratory rate
- Cyanosis (Healthline 2012)

    - Cyanosis is a condition where the skin turns blue/purple due to lack of oxygen. This often occurs in body extremities as blood supply to these areas decrease as a result of heart failure.
- Fainting (Healthline 2012)
    - Insufficient blood supply to the brain cells as a result of heart failure will result in fainting
- Nocturia (MedicineNet onhealth 2014)
    - When patients lie down, fluids accumulated in the extremities returns to the heart easier, consequently increase blood perfusion to the kidneys, which in turn result in increased filtration and excretion.
- Swollen abdomen/ abdominal pain
    - Fluid accumulation in the abdominal area and possible liver enlargement can impact on sensory nerves causing abdominal pain
- Disturbed sleep pattern/sleep apnoea (MedicineNet onhealth 2014)
    - Nocturia, shortness of breath and coughing can contribute to disturbed sleeping patterns
- Liver enlargement
    - Reduced blood return to the heart also results in accumulation of blood in the hepatic vein and liver, affecting the hepatocytes and contributing to liver enlargement
- Palpitations

    - The heart beats faster in order to maintain normal cardiac output, especially when the body’s oxygen demand increases, resulting in palpitations.

- Pale, clammy skin
    - Blood perfusion to the skin is reduced, hence cells in the skin layers do not grow and function optimally
- Heart grows larger (UCSF Medical Centre)
    - In order to compensate for the reduced cardiac output, the cardiac cells grow in size so stronger contractions can take place, causing the heart to grow larger. The heart chambers also enlarge and stretch so they can hold a larger volume of blood.
- Blood vessels narrow (UCSF Medical Centre)
- Reduced blood return to the heart results in less blood flow through the veins, which causes decreased blood pressure in these vessels. To compensate for this, veins start becoming narrower to maintain the pressure.
- Blood flow is diverted (UCSF Medical Centre)
- When the blood supply is no longer able to meet all of the body’s needs, it is diverted away from less crucial areas such as the limbs, and instead channelled to the vital organs including the heart and brain. In turn, physical activity becomes more difficult as heart failure progresses.
- Constipation

- Reduced blood supply to the smooth muscles in the intestines reduce contraction and overall motility resulting in constipation

4. List the information taken on his admission that demonstrates these signs and symptoms.

- Cyanosis – blue/purple discolouration of skin indicates inadequate oxygen supply to the extremities
- Dyspnoea – shortness of breath indicates fluid accumulation in lungs
- Low oxygen saturation level – fluid accumulation impairs gas exchange in the lungs
- Hypotensive – reduced cardiac output causes low blood pressure
- High pulse rate – tachycardia occurs to compensate for reduced cardiac output
- Increased respiratory rate – to compensate for reduced oxygen levels in the tissues
- Ulcer – Reduced blood supply to lower limbs contribute to impaired wound healing
- Loss of appetite – Reduced blood flow to digestive system
- Constipation – Reduced blood supply to smooth muscles in GI tract
- Confusion – Imbalance in body electrolytes e. g. sodium and potassium

5. Do you think his diabetes is related to his leg ulcer and amputated left toe? Explain.

Yes, I think that his diabetes is related to his leg ulcer and amputated left toe as poorly controlled diabetes causes peripheral neuropathy (nerve damage) (National Diabetes Information Clearinghouse NDIC 2013) and peripheral vascular disease (impaired circulation causing cell ischemia).

Over time, high blood sugar levels in the blood causes nerve damage in the body, which may be asymptomatic initially. These damaged nerves cannot transmit messages to the brain effectively, hence causing loss of feeling particularly in the body extremities.

On the other hand, adequate blood supply is vital to facilitate wound healing and to resolve underlying infections. In poorly controlled diabetes, blood flow is impaired, thus tissues do not receive sufficient nutrients to repair themselves. There is also an increased risk of infection (due to inadequate white blood cells to fight off bacteria/foreign matter), which can turn into an ulcer if not taken care of. The tissues can also become necrotic after prolong period of inadequate blood supply and amputation may be required.

This is likely to have happened to Mr Wright, being unaware of a wound that he had due to sensory loss, the wound gradually worsen as blood flow was impaired. The wound slowly progresses to an ulcer, and eventually had to be amputated.

6. One of the medications he is taking is Lasix. What is the action of Lasix? Which body systems are affected by it? Explain why you think Mr. Wright is ordered Lasix. (Your answer need only be brief.)

Lasix is the trade name of frusemide, which is a loop diuretic. It inhibits the reabsorption of sodium and chloride ions in the ascending limb of the loop of Henle, which accounts for retention of approximately 20% of filtered sodium in the kidney. (Australian Medicines Handbook 2012) As water follows sodium and chloride ions, reducing reabsorption of these ions also reduces water retention. Therefore, the main systems that are affected by frusemide

is the cardiovascular system and the urinary system. In Mr Wright's situation, congestive cardiac failure results in fluid retention in the lungs and legs. Frusemide has been to assist the body in getting rid of excessive fluids through the excretion in the urine. This would improve his oedema symptoms as well as shortness of breath.

7. List three conditions in Mr. Wright's relevant medical history that are commonly associated with ageing.

- Type 2 Diabetes – pancreatic islet slowly deteriorate causing reduced insulin production, cell receptors might also be less sensitive to insulin, hence increasing blood glucose level
- Arthritis – as the body ages, cartilage in the joints gradually wear out causing pain during movement
- Glaucoma – increased pressure in the eyes due to inefficient clearing of aqueous humour

8. Using Mr. Wright's admission history and assessment, list the factors that may impact on his safety whilst in hospital and when he returns home.

- Mr Wright claim that he has very blurry vision after using his drops. As he might not be able to see clearly, he is more likely to fall if there are obstacles in his home.
- Mr Wright's history of asthma and low oxygen saturation means that he can have asthma attack at any time especially during exertion or after long distance of walk. The feeling of out of air and panic can increase the risk of falling.

- Mr Wright’s blood pressure is lower than normal, which can contribute to orthostatic hypotension and dizziness, further increasing his falling risk.
- Mr Wright has an ulcer on his lower left leg, which is prone to further infection if not taken care of properly. Infection causes pain, redness, swelling and dead tissue which can affect his stability while moving.
- Mr Wright has Type 2 diabetes which means he has to constantly monitor his blood glucose level. It can be quite dangerous if he becomes hypoglycemic, as he may experience dizziness or even fainting.
- Mr Wright is orientated but slipping into confusion. This puts him in greater danger during his daily activities. Confusion can also lead to medication misadventure, which can have disastrous impact.
- Mr Wright is currently on multiple medications. The common adverse effects of medications are nausea and dizziness, which therefore increase his falling risk.
- The fact that Mr Wright has to walk with walking aid suggests that he is not steady on his feet, thus he is more prone to fall.
- Mr Wright is experiencing chronic pain due to his arthritis on his left hip. The pain that he is undergoing can increase the risk of fall as well, especially when he gets out from the bed, when the affected site can be stiff and painful.

9. What other health professionals will be involved in his care and what services can they provide for Mr. Wright.

1. Podiatrist

- Deal with the prevention, diagnosis and management of foot problems
- Carry out regular checks to determine patient’s feet health
- Provide necessary foot care for Mr Wright due to his diabetes (i. e manicure and pedicure)

2. Dietician

- Provide expert nutrition and dietary advice by translating scientific information into practical advice in diets.
- Work out a suitable diet plan for Mr Wright to manage his condition while ensuring sufficient nutrition.

3. Cardiologist

- Develop a management plan to suit his heart condition and diabetes
- Monitoring for any symptoms that suggest worsening of his condition

4. Nurses

- Assist in managing Mr Wright’s condition during his stay in the hospital, develop a care plan to assist in the recovery of functions and prevent deterioration of his condition
- Help in managing Mr Wright’s asthma condition, regular spirometry check up to monitor his lung function
- Educate Mr Wright about lifestyle changes in order to maintain good health.
- Access Mr Wright’s ulcer and provide proper wound care such as choice of wound dressing to control the amount of exudate and promote wound healing

5. Occupational therapist

- Helping Mr Wright to regain or enhance his daily life after discharge
- Assessing and modifying Mr Wright’s home and community to improve his functional independence as well as to reduce falling risks
- Educating Mr Wright in the use of home health equipment to assist function

6. Physiotherapist

- Access Mr Wright’s movement and assisting him to overcome movement disorders
- Assisting in management of his chronic pain

7. Pharmacist

- Manage his medications and provision of Webster-pak and medical advice

8. Social worker

- Provide everyday care that is needed by Mr Wright after discharge, for example bathing, meals, shopping, transportation and social support

9. Ophthalmologist

- Management and monitoring of his glaucoma

10. Dentist

- Provide dental care to Mr Wright, make sure that all his teeth and gums are healthy. This is because the teeth share the same artery as the heart, infection in the teeth can spread to the heart.

10. List the nursing documentation you would expect to be used in the care of Mr Wright.

- Fluid balance chart
- Bladder chart
- Bowel chart
- Diabetic management chart
- History assessment
- Neurovascular observation chart
- Pain assessment
- Nursing wound assessment and dressing regime
- Weight chart
- Medication chart
- Falls risk assessment tool
- Patient admission form
- Progress notes
- Pressure area observation/care plan
- Individual care plan
- Observations graphic chart

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